

HARBOR ISLAND
SEATTLE, WASHINGTON

The Situation:

High levels of lead have been measured in the ambient air and surface dust on Harbor Island, an industrial parcel of land at the mouth of Duwamish Waterway where it empties into Seattle's Elliott Bay. Air monitoring equipment has recorded concentrations of lead at levels several times the national standard established to protect human health. There is also concern that lead-laden dust and accumulations of lead in the Harbor Island soil has resulted in run-off of lead into nearby surface water and, by percolation, has caused lead to enter groundwater.

Work Done To Date:

The City of Seattle has paved areas where concentrations of airborne lead are the highest.

In addition, one industrial operation that is a source of airborne lead has instituted control measures to reduce fugitive lead-laden dust and emissions of lead from its industrial process.

What's Next?

The City of Seattle is committed to pave more surface areas of Harbor Island.

It must be determined to what extent, and in what relative degree of combination, the lead problems on Harbor Island are being caused by current emissions from one or more industrial sources as opposed to the re-suspension of the accumulations of lead in soil and dust on the surface of the island.

USEPA SF



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AR 47494

HT 1.1 - 0003

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10WA 008

Facility name:	Harbor Island Lead		
Location:	Harbor Island, Seattle, WA		
EPA Region:	10		
Person(s) in charge of the facility:	As above		
Name of Reviewer:	H. Aldis	Date:	8/2/82
General description of the facility:			
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)			
Lead battery recycling plant on the island. Very heavy accumulation of lead in soils and dust on the plant site resulted in			
in lead run off into surface water. percolation into unused			
ground-water and dust in ambient air with resultant exposure			
to some 6000 workers in a heavily industrial area.			
Scores: $S_M = 34.6$ $S_{gw} = 0$ $S_{sw} = 10.9$ $S_s = 58.5$ $S_M = 34.60$			
$S_{FE} = 0$			
$S_{DC} = 50\%$			

updated scores

FIGURE 1
HRS COVER SHEET

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IOWA 008

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0	45	1	0	45	3.1
If observed release is given a score of 45, proceed to line 11 . If observed release is given a score of 0, proceed to line 21 .						
2 Route Characteristics						3.2
Depth to Aquifer of Concern	0 1 2 3	2	6	3		
Net Precipitation	0 1 2 3	1	3	3		
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3		
Physical State	3 1 2 3	1	2	3		
Total Route Characteristics Score			13	15		
3 Containment	0 1 2 3	1	3	3		3.3
4 Waste Characteristics						3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8		
Total Waste Characteristics Score			26	25		
5 Targets						3.5
Ground Water Use	0 1 2 3	3	0	9		
Distance to Nearest Well/Population Served	0 4 8 12 16 12 16 18 20 24 24 30 32 35 40	1	0	40		
Total Targets Score			0	49		
6 If line 1 is 45, multiply 1 x 2 x 3 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	57.200		
7 Divide line 6 by 57.200 and multiply by 100			S _{gw} = 0			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

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10WA008

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi-plier	Score	Max. Score	Ref. Section
1 Observed Release	0	45	1	45	45	4.1
If observed release is given a value of 45, proceed to line 21 . If observed release is given a value of 0, proceed to line 21 .						
21 Route Characteristics						4.2
Facility Slope and Intervening Terrain	0	1	2	3	1	3
1-yr. 24-hr. Rainfall	0	1	2	3	1	3
Distance to Nearest Surface Water	0	1	2	3	2	6
Physical State	0	1	2	3	1	3
Total Route Characteristics Score				—	15	
3 Containment	0	1	2	3	1	—
					3	4.3
41 Waste Characteristics						4.4
Toxicity/Persistence	0	3	6	9	12	15
Hazardous Waste Quantity	0	1	2	3	4	5
Total Waste Characteristics Score				26	25	
43 Targets						4.5
Surface Water Use	0	1	2	3	3	6
Distance to a Sensitive Environment	2	1	2	3	2	6
Population Served/Distance to Water Intake Downstream	0	4	6	8	10	40
	12	16	18	20		
	24	30	32	35	40	
Total Targets Score				6	33	
51 If line 1 is 45, multiply 1 x 41 x 3					7020	
52 If line 1 is 0, multiply 2 x 31 x 41 x 3					34,350	
7 Divide line 51 by 34,350 and multiply by 100					S_{SW} = 10.91	

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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10 WAC08

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Per. (Section)	
1 Observed Release	0 <u>45</u>	1		45	5.1	
Date and Location:						
Sampling Protocol:						
If line 1 is 0, the $S_1 = 0$. Enter on line 3 . If line 1 is 45, then proceed to line 2 .						
2 Waste Characteristics					5.2	
Reactivity and Incompatibility	<u>0</u> 1 2 3	1	<u>0</u>	3		
Toxicity	0 1 2 <u>3</u>	3	<u>9</u>	9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 <u>8</u>	1	<u>8</u>	8		
Total Waste Characteristics Score			<u>17</u>	20		
3 Targets					5.3	
Population Within 4-Mile Radius	0 3 12 15 18 21 <u>24</u> 27 30	1	<u>24</u>	30		
Distance to Sensitive Environment	<u>0</u> 1 2 3	2	<u>0</u>	6		
Land Use	0 1 2 <u>3</u>	1	<u>3</u>	3		
Total Targets Score			<u>27</u>	39		
4 Multiply 1 x 2 x 3			<u>20655</u>	25.100		
5 Divide line 4 by 35.100 and multiply by 100			<u>58.85</u>			

FIGURE 9
AIR ROUTE WORK SHEET

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10WAC08

	s	s ²
Groundwater Route Score (S _{gw})	0	0
Surface Water Route Score (S _{sw})	10.91	119.03
Air Route Score (S _a)	58.85	3463.32
$S_{gw}^2 + S_{sw}^2 + S_a^2$		3582.35
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		59.85
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		34.60

FIGURE 10
WORKSHEET FOR COMPUTING S_M

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10WA008

Fire and Explosion Work Sheet									
Rating Factor	Assigned Value (Circle One)					Multi- plier	Score	Max. Score	Ref. Section
1 Containment	1		3			1	-	3	7.1
2 Waste Characteristics									7.2
Direct Evidence	0		3			1		3	
Ignitability	0	1	2	3		1		3	
Reactivity	0	1	2	3		1		3	
Incompatibility	0	1	2	3		1		3	
Hazardous Waste Quantity	0	1	2	3	4	5	6	7	8
Total Waste Characteristics Score							-	20	-
3 Targets									7.3
Distance to Nearest Population	0	1	2	3	4	5	1	5	
Distance to Nearest Building	0	1	2	3			1	3	
Distance to Sensitive Environment	0	1	2	3			1	3	
Land Use	0	1	2	3			1	3	
Population Within 2-Mile Radius	0	1	2	3	4	5	1	5	
Buildings Within 2-Mile Radius	0	1	2	3	4	5	1	5	
Total Targets Score								24	
4 Multiply 1 x 2 x 3								1,440	
5 Divide line 4 by 1,440 and multiply by 100							S.F.E. = 0		

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

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LOWA008

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
[1] Observed Incident	0 <u>45</u>	1	<u>45</u>	45	3.1	
If line [1] is 45, proceed to line [4] If line [1] is 0, proceed to line [2]						
[2] Accessibility	0 1 2 3	1	—	3	3.2	
[3] Containment	0 15	1	—	15	3.3	
[4] Waste Characteristics Toxicity	0 1 2 <u>3</u>	5	<u>15</u>	15	3.4	
[4] Targets					3.5	
Population Within a 1-Mile Radius.	0 1 2 3 <u>4</u> 5	4	<u>16</u>	20		
Distance to a Critical Habitat	<u>0</u> 1 2 3	4	<u>0</u>	12		
Total Targets Score			<u>16</u>	<u>32</u>		
[5] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			<u>10800</u>	21,500		
[7] Divide line [5] by 21,500 and multiply by 100			Soc = <u>50.00</u>			

FIGURE 12
DIRECT CONTACT WORK SHEET

June 23, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Harbor Island Lead

LOCATION: Harbor Island, Seattle, Washington

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Not named, Not used. Almost at sea level on artificial island.

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Probably less than 20 feet to ground water.

Depth from the ground surface to the lowest point of waste disposal/
storage:

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

November-April=29.57"

Mean annual lake or seasonal evaporation (list months for seasonal):

November-April=5.52"

Net precipitation (subtract the above figures):

24.05"

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Sand and silt (Artifical fill)

Permeability associated with soil type:

10^{-3} - 10^{-5}

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Dust

Powderlike Score=2

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

None- Surface dust

Method with highest score:

As above

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Lead

Compound with highest score:

Lead

Toxicity "3" 4th Edition SAX
Persistence "3" NFPA Volume 13
Matrix "18"

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

per Fred Austin, PSAPCA, May '83-

latest average concentration of lead in soil is 3.4% and found contamination 6" deep use acreage provided by RSR in comment 31.26 acres (instead of 40.0)

continued 4B

Basis of estimating and/or computing waste quantity:

* * *

per RSAPCA emissions of Pb in particulate
greater than or equal to 35% of total particulate, there fore waste
generated less than or equal to 100/35 times amount of lead found
in soil, so can use a factor of 100/35 and this is conservative
per Jack Sceva, EPA, Region 10 geologist,
density of soil 112.38 lb/ft³

$$(31.26) (43560) \left(\frac{3.4}{100}\right) \left(\frac{100}{35}\right) (112.38) \left(\frac{1}{2}\right) \left(\frac{1}{2000}\right) = 3716.35 \text{ tons}$$

Score =8

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

None

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

None

Distance to above well or building:

None

Population Served by Ground Water Wells Within a 3-Mile Radius.

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

None

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

None

Total population served by ground water within a 3-mile radius:

0

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

High levels of lead in sediments opposite storm drain (Lander Street) discharge points draining Harbour Island (John Roberts PSAPCA)

Ave conc: 2700 mg-1/kg dry sediment Max conc: 8530 mg-1/kg dry sediment
Tom Hubbard, City of Seattle, METRO (206) 447-6891

Rationale for attributing the contaminants to the facility:

Contamination corresponds to damage from area contaminated by facility. The contents of the storm drains run directly into the Duwamish River.

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2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Less than 2%

Name/description of nearest downslope surface water:

Duwamish River and Elliot Bay

Average slope of terrain between facility and above-cited surface water body in percent:

Less than 2%

Is the facility located either totally or partially in surface water?

Yes Harbor Island is a man made island in the mouth of the Duwamish River.

Is the facility completely surrounded by areas of higher elevation?

No

1-Year 24-Hour Rainfall in Inches

1.8" (20% of 2year 24hour Rainfall) NOAA Atlas Z

Distance to Nearest Downslope Surface Water

Immediately adjacent

Physical State of Waste

Dust

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

None

Method with highest score:

As Above

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Lead

Compound with highest score:

Lead

Toxicity "3" 4th Edition SAX
Persistence "3" NFPA Vol: 13
Martix Value "18"

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

See page 4 & 4B (Hazardous Waste Quantity)

Basis of estimating and/or computing waste quantity:

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

and recreational boating and fishing

Ref. Jack Sceva, Senior Geologist Region X EPA
Seattle (206) 442-1641

Wallace C. Swofford, R.S., Seattle King County
Dept. of Public Health, Seattle (206) 587-2722

Is there tidal influence?

Yes

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

None

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None

Computation of land area irrigated by above-cited intake(s) and
conversion to population (1.5 people per acre):

None

Total population served:

None

Name/description of nearest of above water bodies:

Duwamish River, Elliot Bay

Distance to above-cited intakes, measured in stream miles.

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

Lead

Date and location of detection of contaminants

1977- present hi vol.-every six days.

K60. PSAPCA station

K71. 79t Texaco 1980- present 7.42

Methods used to detect the contaminants:

Hi-vol Standard EPA

Rationale for attributing the contaminants to the site:

Concentric distribution of lead dust around facility

Blood lead levels in nearby workers

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

No

Most incompatible pair of compounds:

None

Toxicity

Most toxic compound:

Lead Toxicity "3" 4th Edition SAX

Hazardous Waste Quantity

Total quantity of hazardous waste:

See page 4 & 48 (Hazardous Waste Quantity)

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi	0 to 1 mi	0 to 1/2 mi	0 to 1/4 mi
less than	less than		
10000	10000	6000	2500 workers

Ref. John Roberts, Source Test Engr.
PSAPCA

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Within commercial/industrial area

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

None

Distance to residential area, if 2 miles or less:

1/4-1/2 mile

Distance to agricultural land in production within past 5 years, if 1 mile or less:

None

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

None

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

None known